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SUBJECT: CURRENT STATE OF PLAY IN JORDAN'S NUCLEAR ENERGY
PROGRAM: AGREEMENTS GALORE, URANIUM EXPLORATION UNDERWAY,
MULTIPLE REACTORS UNDER CONSIDERATION

REF: A. AMMAN 583
[1](#)B. 08 AMMAN 3011
[1](#)C. 08 AMMAN 2994
[1](#)D. 08 AMMAN 1138

Classified By: Ambassador R. Stephen Beecroft
For Reasons 1.4 (b) and (d)

[1](#)1. (S/NF) Summary: The Jordan Atomic Energy Commission (JAEC) continues to engage numerous foreign countries on the development of Jordan's nuclear energy program. This approach at times has created confusion, particularly in the press, as to which deals have actually been finalized or are merely under consideration. The Government of Jordan (GOJ) has signed Memoranda of Understanding (MOUs) on nuclear energy with the U.S., Canada, France, Korea, Russia, Romania, and the UK, as well as Nuclear Cooperation Agreements (NCAs) with Canada, China, France, and Korea. Uranium exploration in Jordan has moved forward with the French company AREVA, the British-Australian firm Rio Tinto, and the Chinese company Sino Uranium. The GOJ plans to issue an RFP imminently for an international consulting firm to help develop the tender for a nuclear reactor. Entertaining the possibility of building more than one reactor, JAEC has explored potential technologies with various international firms, including the French, Chinese, Koreans, U.S., Russians, and Canadians. Jordan plans to follow a Public-Private Partnership ("PPP") model in which the owner or operator would receive an equity share in the plant, as well as the government. The GOJ issued an RFP for a research reactor in January 2009 and is still receiving offers. Despite a flurry of activity, there is little clarity on which partners the GOJ hopes to seriously engage, raising concerns within the diplomatic community about how well

thought out the GOJ's approach to developing nuclear energy is. At the Ambassador's urging, the GOJ only recently briefed Israel on its plans and to the best of Post's knowledge, has yet to engage Egypt. The Israeli ambassador raised concerns about brine and seismic activity, and the two sides agreed that their experts should soon meet. End Summary.

MOUs and Nuclear Cooperation Agreements Galore

¶2. (U) During a DOE/NNSA Middle East Infrastructure Preparedness Workshop in Amman from March 22-26, Ned Xoubi, the JAEC Commissioner for Fuel Cycle and head of the Jordan Energy Resources Inc., outlined the current status of Jordan's nuclear energy program. Xoubi clarified the various agreements that Jordan has signed with major nuclear energy players worldwide. He indicated that in addition to the U.S., the GOJ has signed MOUs on nuclear energy with Canada, Korea, Romania, Russia, and the UK. Jordan has also signed NCAs with Canada, China, France, and Korea. Details on each of the agreements follow.

¶3. (SBU) Canada: In June 2008, JAEC signed an MOU with Atomic Energy of Canada Limited and SNC-Lavalin International to start bilateral nuclear-related technology cooperation. In February 2009, the governments of Jordan and Canada signed an NCA, which allows Canada to provide Jordan with technology

to build a nuclear reactor for energy-generating purposes as

well as water desalination. It also enables the two countries to carry out research and development projects, including the use of nuclear energy in agriculture, industry, and medicine. The Trade Commissioner at the Canadian Embassy in Jordan noted to Econoff that the agreement was fast-tracked since it was Canada's first NCA in ten years.

¶4. (U) China: The GOJ signed an NCA with China in August 2008, as well as a protocol to the agreement in November 2008. The press reported that the agreements allow cooperation and exchanges between the two sides on human resource training, uranium mining and processing, and nuclear plant design, construction and operation. In September 2008, JAEC also signed with China a MOU specifically addressing uranium extraction and development techniques. Another agreement was signed in November 2008 to allow Jordan to purchase a \$2.65 million subcritical assembly from China to be used for training students at the Jordan University of Science and Technology (JUST).

¶5. (U) France: The GOJ signed an NCA with France in May 2008 and a protocol to the agreement in August 2008, which aim to enhance and institutionalize cooperation in the nuclear field between Jordanian and French companies. The agreement led to the creation of a Joint Higher Jordanian-French Steering Committee whose mission is to develop a nuclear strategy and mechanisms to foster cooperation between the two sides in areas such as uranium mining, the building of a nuclear power plant, nuclear fuel cycle, nuclear waste management, safety regulations, and human resource development.

¶6. (C) Korea: Jordan signed an NCA and a MOU with Korea in December 2008. Chul Lee, Deputy Head of Mission in the Korean Embassy in Amman, said that the agreements enable Korean companies to participate in nuclear power projects, although many firms still want to see the NCA signed with the U.S. as an additional assurance. He stressed the importance of the nuclear power plant project for Korea as the first time the country would export its nuclear power generation technology.

¶7. (SBU) Russia: Xoubi noted that in addition to an MOU with Russia, the GOJ initialed an NCA with Russia in February 2009. The agreement would allow for the construction of nuclear power plants and research reactors, as well as

cooperation in human resource development and the exploration and mining of nuclear materials in Jordan. JAEC Deputy Chairman Kamal Araj told press that the management of nuclear waste would be a distinguishing feature of a nuclear package with Russia given that nuclear fuel would be returned to Russia after being used in Jordan. Xoubi said that the GOJ has gotten feedback from the Russian government that it will be ready to sign the agreement in April 2009.

¶18. (U) UK: Jordan and the UK signed an MOU on nuclear cooperation in June 2008, which was meant to pave the way for a nuclear cooperation agreement in the future. Press reported that the parties agreed to cooperate on the establishment of a reliable source of nuclear fuel for future nuclear reactors in the Kingdom. The MOU also highlighted cooperation on the development of human resources and nuclear safety, power generation, and desalinating water using nuclear energy.

Uranium Exploration Moving Forward

¶19. (SBU) The GOJ established Jordan Energy Resources Inc. (JERI) as JAEC's commercial arm, which can contract or partner with foreign companies to implement Jordan's nuclear energy program. Currently responsible for uranium exploration, JERI has identified six areas of potential uranium reserves (not in phosphates): 1) Northern Jordan, near Mafraq and the Syrian border; 2) Ruwaished, in northeastern Jordan near the Iraqi border; 3) Central Jordan, south of Amman near Attarat Um Gudhran and Wadi Maghar; 4) Haranah, slightly northeast of the Central Jordan block; 5) Wadi Bahiyyah in southern Jordan; and 6) Wadi Sahb Elabiadh in the southeast. JERI also plans to explore at a later stage two additional areas in southern Jordan close to the Saudi border, which may contain other elements needed for a nuclear program such as zirconium.

¶10. (SBU) In December 2008, JERI and the French company AREVA established a 50-50 joint company called the Jordanian-French Uranium Mining Company (JFUMC) to explore the Central Jordan block, where most exploration has been done to date. JFUMC has been conducting geochemistry tests and developing a bankable feasibility study for this area, which is estimated to contain uranium reserves of 64,000 tons (out of an estimated 130,000 tons countrywide) mostly found at 1.5 meters below the surface and suitable for extraction. This block is expected to produce an estimated 2,000 tons per years of uranium by 2012. The local media has reported that this project will lead to the construction of the Kingdom's first uranium mine and plant.

¶11. (SBU) In February 2009, JERI contracted the British-Australian firm Rio Tinto to begin reconnaissance and prospecting work in Ruwaished and Wadi Sabh Elabiadh. This project is not as advanced as the work being done in central Jordan because the quantity and grade of the uranium reserves in those areas are not yet known. The firm will conduct initial phases of grid studies and sample collecting to determine prospects for future exploration of uranium. After 18 months, if the results are promising, the government intends to negotiate an exploration agreement leading to the establishment of another joint company between JERI and Rio Tinto.

¶12. (SBU) Xoubi reported that JERI has two teams that are exploring uranium reserves in the Northern Jordan and Wadi Bahiyyah blocks. According to the press, the Chinese company Sino Uranium has been helping JERI in those areas by taking gamma measurements in preparation for mining.

PPP for One or Multiple Nuclear Power Plants

¶13. (C) Different GOJ officials have projected different dates for the start of Jordan's first nuclear power plant ranging between 2015 and 2020. Noting that it is all just

speculation, Xoubi opined that Jordan will have done an "excellent" job if it can get a plant running by 2020. JAEC Chairman Khaled Toukan previously told Econoff and local press that a RFP would be issued by mid-March for an international consultant to help Jordan develop the preconstruction phase of the nuclear power plant, including

feasibility studies, technology selection, fuel cycle, waste management, and safety procedures (ref A). The consultant would also prepare bid documents for the nuclear power plant, with the goal of announcing an international tender for the plant's construction no later than the first quarter of 2011.

As of March 23, Xoubi confirmed that changes were still being made to the RFP for the consultant, and the tender would most likely be issued in early April.

¶14. (SBU) Xoubi reconfirmed Toukan's previous statements that the GOJ plans to follow a PPP model for the nuclear power plant (ref A). He said that the GOJ expects to have some equity in the plant, but it would not necessarily need to have a majority share and would be willing to consider multiple partners or different investment configurations.

¶15. (C) Jordan initially anticipated a single 400 MW nuclear reactor in order to keep nuclear power at about 10% of the overall grid. Given that such a small sized reactor is not commercially available, Jordan began considering larger reactors, around 1,000 MW, which could also support desalination. JAEC is now entertaining the idea of building more than one reactor, which could be used to provide pumping power for the Red-Dead canal project (ref B) and/or exporting power to the region. Xoubi said that Jordan has proposed to Egypt to increase their electricity interconnection from 500 MW to 1,000 MW and plans to approach Syria with increasing their electricity interconnection from 300 MW to 500-1,000 MW. Toukan told press that JAEC has identified a site on the south beach of the Gulf of Aqaba, outside the Aqaba Special Economic Zone and nine kilometers inland, which could potentially host four to six nuclear power plants. Xoubi commented confidentially to Econoff that such plans for multiple reactors in a relatively small area seem unrealistic given the high demand for multiple infrastructure and tourist projects in the same vicinity.

¶16. (SBU) JAEC has continued to express interest in American-built reactors, particularly from GE and Westinghouse, but has noted that the lack of a NCA has hindered any real negotiations with U.S. companies (ref A). Another model still under consideration is the 700 MW Canadian CANDU reactor, which Canadian Liberal MP Bob Rae promoted during a March 18 visit as being reliable and efficient technology that has been built in the past under-budget and under-time. There have also been innumerable press reports about Jordan promising reactor projects to various other foreign companies, including the Chinese and AREVA which has always been portrayed as the frontrunner.

¶17. (C) Most recently, the Prime Minister of Korea visited Jordan on March 19 and promoted Korean technology as being a competitive choice in terms of pricing and a short time-frame for construction, which Lee said could be between 8.5 to 10 years from the time of site selection. The CEO of the Korean Electric Power Corporation (KEPC) was also recently quoted in the press as saying that Korea was previously being considered for Jordan's second nuclear power plant but now was competing with AREVA for the first reactor and a deal might be concluded as early as April or May 2009. Lee noted that the JAEC had indicated to the Korean Ambassador that a decision might be made slightly later in July 2009, but confirmed that JAEC made it seem as though the Koreans had a

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good shot at the first nuclear reactor. Lee said the Koreans are looking at providing its 1,400 MW Advanced Pressurized Reactor, but the Jordanians still need to figure out how its

power system would absorb such capacity. JAEC has also suggested to the Koreans that a direct bilateral deal might be possible instead of an international tender. Given the recent announcements by JAEC to hire an international consultant to prepare bid documents and ongoing discussions with other foreign companies, Lee had no indication as to which path the Jordanians were actually going to take. The GOJ's ability to finance the project also seemed unclear at this point in Lee's view.

RFP Out for Research Reactor

¶18. (SBU) JUST has a subcritical assembly under construction that is supposed to be completed by the end of 2009. An RFP for a research reactor was also issued on January 15, 2009 and sent to major producers in South Korea, China, Argentina, and the U.S. (specifically General Atomics). Xoubi said that offers for the research reactor are still being received.

¶19. (S/NF) Comment: There is considerable action by the JAEC in developing Jordan's nuclear energy program, but surprisingly little coordination. The numerous agreements reflect Toukan's position that Jordan's energy needs should not be subject to direct or indirect control by any one country (ref C). The round-robin approach, however, has created confusion about the extent of Jordan's program and its current stage of development. At the Ambassador's urging, the GOJ only recently briefed Israel on its plans and to the best of Post's knowledge, has yet to engage Egypt. The Israeli ambassador raised concerns about brine and seismic activity, and the two siQ agreed that their experts should soon meet.

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